Saskatchewan

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Agriculture Development Fund

FINAL REPORT

20000098

EVALUATION OF THE EFFICACY OF THE WISDOM BLIGHTCAST PROGRAM FOR THE PREDICTION OF ENVIRONMENTAL CONDITIONS CONDUCIVE TO POTATO LATE BLIGHT

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Prepared by: Saskatchewan Seed Potato Growers Association Inc.

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SASKATCHEWAN AGRICULTURE AND FOOD
AGRICULTURE DEVELOPMENT FUND (ADF)

PROJECT NO.: 20000098

PROJECT TITLE: Evaluation of the Efficacy of the Wisdom Blightcast Program for the Prediction of Environmental Conditions Conducive to Potato Late Blight

PROJECT CONSULTANT: Saskatchewan Seed Potato Growers Association, Inc.

FINAL REPORT

A. Summary

The project's objective was to determine the WISDOM BLIGHTCAST software used in the forecasting of the development of potato late blight was providing valid readings for Saskatchewan conditions. Four years of raw weather data from selected late blight weather stations were analyzed through three late blight forecasting programs. Where the programs allowed, relative humidity thresholds were adjusted to 70%, 80%, 85% and 90%. We found that a threshold of 90% was too high to give accurate predictions. Thresholds of 80% or less were too low. A threshold of 85% was found to give the best predictive results for Saskatchewan conditions. We also determined that the program NegFry provided the best overall forecasting results and spray application schedules. As a result, we will be changing our forecasting program to NegFry, using a relative humidity threshold of 85%. This program provides us with the optimal information to give to our client-growers for use in their management of late blight.

B. Technical Report

Members of the SSPGA met with researchers from the University of Saskatchewan and Saskatchewan Agriculture and Food (the "technical team") to identify and discuss areas of concern with our current late blight forecasting software, Wisdom Blightcast. We reviewed the weather data available, initially identifying three years of suitable data on approximately four stations and two years of good data on eight stations. Data gathered during the 2001 season was also to be used. We purchased an updated

version of the Campbell Scientific software used by the computer to download the raw data from the dataloggers. We found we were having problems with the datalogger/modem/computer connections which the newer version of the software eliminates.

Our initial research design was to collaborate with Manitoba, through exchange of data, to evaluate the validity of each province's results. However in our discussions with Manitoba personnel, we found that they had a problem with several years of their data set. We therefore made the decision to work only with our own data sets.

In June, 2001, a consultant, Peter Hagel, was hired to review the raw data gathered from the weather stations and to assess the various models of disease risk assessment which our preliminary search of late blight models had identified. Mr. Hagel was then given the task of running the raw weather data through the various models in an attempt to determine which model was the most "user friendly" -- best able to change the parameters to meet our local conditions, and which gave the "best" results.

In all late blight forecasting programs, the amount of relative humidity and the duration of the threshold amount is the most important variable. Therefore, to accurately predict the possibility of a late blight infestation occurring, we need to know what is the optimal percentage of relative humidity for our conditions. When working within the Wisdom Blightcast program varying the relative humidity threshold is most difficult. However, Mr. Hagel was successful in developing an Excel file which enabled him to import the raw weather data and manipulate it to allow for varying thresholds.

The technical team met regularly with Mr. Hagel to monitor the progress, look at results and suggest other avenue of investigation. He ran the data through several late blight forecasting programs, including NegFry, Castor and Wisdom Blightcast, using different percentages of relative humidity as a threshold. Using this method, he was able to determine that the NegFry program (which is available free of charge of the internet), with a threshold of 85% was the most predictive program. In all instances when late blight occurred, it correctly predicted that an outbreak was possible within the prescribed time-frame. Further, it gave a more rational spray schedule than did the Wisdom Blightcast program. The Castor program did not provide a recommendation for a schedule of chemical applications.

C. Outcomes

The project determined that the Wisdom Blightcast model was not the best model to use in our particular environmental conditions. Further, it was not the most user-friendly model to work with. The NegFry program, developed in Belgium and available free of charge on the internet, was much easier to use. It was easier to change parameters within the model so as to adapt it to our specific requirements. It also provided the overall best prediction of an outbreak. When compared with Wisdom Blightcast, it gave the most efficient spray scheduling recommendation. As operators of the system, the technical team is much more confident that the results of the future late blight results will be more reliable and relevant using the NegFry program.

This project has lead to a further research project by an undergraduate student at the University of Saskatchewan. She will be working with one or two selected growers, looking at the actual amount of sprays which were applied compared to the recommendations of NegFry.

D. Personnel

The following personnel have been involved with the project to date:

Name	Organization	Time Spent	Salary/Contract
Dianne Moebis	SSPGA	3.5 weeks	in kind
Dr. Doug Waterer	University of Sask.	1 week	in kind
Dr. Jill Thompscn	University of Sask.	2 day s	in kind
Andrew Sullivan	Sask Ag & Food	2.5 weeks	in kind
Connie Achtymichuk	Sask Valley Potato	0.5 day	in kind
Peter Hagel	Consultant	17 weeks	

E. Equipment

An updated version of the Campbell Scientific Datalogger software was purchased to increase the communications reliability between each weather station's datalogger and the central computer.

F. Project Developed Materials

Copies of NegFry Results are attached.

G. Project Photos

No project photos are available.

H. Acknowledgement

The project results will be reported in the next issue of ***SPUDNOTES***, and will be presented at the Western Potato Council/Sask. Seed Potato Growers Association Conference to be held in Saskatoon on December 12 & 13, 2001.

The SSPGA has acknowledged, with appreciation, the participation of Saskatchewan Agriculture and Food, ADF, in this project in ***SPUDNOTES***, at its Annual and Semi-Annual General Meetings and on its website.

NegFry Results

Saskatoon 2000		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	8/10, 8/18, 9/2	3
80%	8/11, 8/18, 9/2	3
85%	8/18, 9/5	2
90%	None	0

Late Blight: 8/6

SIDC 2000		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/6, 7/11, 7/18, 7/24, 7/30, 8/5, 8/11, 8/17, 8/24, 9/2, 9/8	11
80%	7/19, 7/24, 7/30, 8/5, 8/11, 8/17, 9/2	7
85%	7/20, 7/25, 8/1, 8/7, 8/14, 8/24, 9/3	7
90%	7/25, 7/31, 8/6, 8/14, 8/29, 9/5	6

Late Blight: 8/7

Riverhurst North 2000		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/14, 7/18, 7/24, 7/30, 8/5, 8/11, 8/17, 8/25, 9/2, 9/13	10
80%	7/19, 7/24, 7/30, 8/5, 8/11, 8/17, 9/2	7
85%	7/24, 7/30, 8/5, 8/11, 8/17, 9/2	6
90%	7/30, 8/5, 8/11, 8/18, 9/3	5

Late Blight: 1st week Sept.

Sask Valley 1 (J. Massey) 2000		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/3, 7/8, 7/14, 7/20, 7/26, 8/2, 8/8, 8/14, 8/22, 9/2	10
80%	7/9, 7/18, 7/24, 8/1, 8/7, 8/13, 8/22, 9/2	8
85%	7/14, 7/21, 7/29, 8/4, 8/10, 8/17, 8/25, 9/2	8
90%	7/20, 7/28, 8/4, 8/10, 8/18, 8/30	6

Late Blight: 8/7

Sask Valley 2 (K. Redlick) 2000		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/5, 7/9, 7/16, 7/22, 7/29, 8/4, 8/10, 8/18, 8/26, 9/3	10
80%	7/11, 7/19, 7/25, 8/1, 8/7, 8/14, 8/21, 8/31	8
85%	7/20, 7/26, 8/2, 8/8, 8/17, 8/31	6
90%	7/26, 8/4, 8/11, 8/30	4

Late Blight: 8/7

NegFry Results

Nipawin 2000		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/7, 7/11, 7/18, 7/24, 7/31, 8/6, 8/12, 8/19, 8/26, 9/3, 9/9	11
80%	7/10, 7/15, 7/21, 7/27, 8/3, 8/9, 8/16, 8/24, 9/3	9
85%	7/13, 7/19, 7/26, 8/3, 8/9, 8/16, 8/24, 9/3	8
90%	7/18, 7/24, 8/3, 8/9, 8/16, 8/24, 9/3	7

Late Blight: 8/22

Yorkton 2000		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/16, 7/23, 7/29, 8/5, 8/11, 8/19, 8/26, 9/2, 9/9, 9/18	10
80%	7/24, 7/31, 8/8, 8/20, 9/2, 9/18	6
85%	7/26, 8/5, 8/13, 9/2, 9/18	5
90%	8/5, 8/14, 9/2, 9/19	4

Late Blight: 7/26

Tisdale 2000		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/23, 8/2, 8/8, 8/14, 8/20	5
80%	7/25, 8/3, 8/11, 8/20	4
85%	8/3, 8/9, 8/17	3
90%	8/11	1

Late Blight: 8/15 (Melfort)

Outlook 1999		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/17, 7/23, 7/29, 8/4, 8/10, 8/16, 8/26, 9/11	8
80%	7/25, 7/31, 8/7, 8/14, 8/21, 9/11	6
85%	7/31, 8/7, 8/15	3
90%	8/10, 8/18	2

Late Blight: 8/2

Saskatoon 1999		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/8, 7/14, 7/20, 7/27, 8/2	5
80%	7/15, 7/24, 8/1	3
85%	7/18, 8/1	2
90%	None	0

Late Blight: late Aug.

NegFry Results

Yorkton 1999		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/11, 7/16, 7/22, 7/31, 8/6, 8/12, 8/18, 8/24, 8/31, 9/6, 9/12	11
80%	7/15, 7/20, 8/1, 8/8, 8/14, 8/20, 8/30, 9/7	8
85%	7/18, 8/6, 8/14, 8/20, 8/31, 9/12	6
90%	8/8, 8/14, 8/21, 9/12	4

Late Blight: mid Aug.

Lucky Lake 1998		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/15, 7/21, 8/1, 8/12, 8/21	5
80%	8/2, 8/16	2
85%	8/3	1
90%	None	0

Late Blight: ?

Outlook 1998		
RH Threshold	Spray Dates (Month/Day)	# of Sprays
70%	7/16, 7/22, 7/29, 8/7, 8/14, 8/21, 9/10, 9/23, 10/4	9
80%	7/21, 8/1, 8/12, 8/22, 9/25	5
85%	8/2, 8/20	2
90%	8/3, 8/22	2

Late Blight: ?

NegFry Results
1998

Site	RH Threshold	Spray Dates (Month/Day)	# of Sprays	Late Blight (Month/Day)
Carrot River	85%	7/10, 7/22, 8/3, 8/15, 8/22	5	None Reported
	90%	7/18, 8/3, 8/15, 8/25	4	
*Interpret with caution				
LDPC 1	85%	7/6, 7/17, 7/29, 8/16, 8/23	5	None Reported
	90%	7/10, 8/2, 8/22	3	
LDPC 2	85%	7/5, 7/15, 7/29, 8/22	4	None Reported
	90%	7/9, 8/2, 8/22	3	
LDPC 3	85%	7/6, 7/16, 8/2, 8/22	4	None Reported
	90%	7/18, 8/2, 8/22	3	
LDPC 4	85%	7/6, 7/17, 8/2	3	None Reported
	90%	8/2	1	
Lucky Lake	85%	7/6, 7/15, 8/2	3	Date Unknown
	90%	8/2	1	
Lumsden	85%	7/10, 7/22, 8/12, 8/24	4	None Reported
	90%	7/18, 8/2, 8/25	3	
*Interpret with caution				
Nipawin	85%	7/10, 7/22, 8/17, 9/10	4	None Reported
	90%	7/18, 8/23	2	
*Interpret with caution				
Outlook (H. Taylor)	85%	7/6, 7/17, 8/2, 8/20, 9/17	5	Date Unknown
	90%	7/10, 8/2, 9/10	3	
*Interpret with caution				
Outlook (W. Redlick)	85%	7/6, 7/16, 8/2, 8/22	4	Date Unknown
	90%	7/18, 8/2, 8/22	3	
SpudCo 1	85%	7/4, 7/14, 8/1, 8/16	4	None Reported
	90%	7/8, 7/23, 8/22	3	
SpudCo 2	85%	7/4, 7/15, 8/2	3	None Reported
	90%	7/6, 8/2	2	
SpudCo 3	85%	7/4, 7/9, 8/1, 8/22	4	None Reported
	90%	7/6, 7/18, 8/2, 8/22	4	
Yorkton	85%	7/10, 7/22, 8/2, 8/19	4	None Reported
	90%	7/18, 8/2	2	
*Interpret with caution				

NegFry Results

1999

Site	RH Threshold	Spray Dates (Month/Day)	# of Sprays	Late Blight (Month/Day)
Carrot River	85%	7/22, 7/28, 8/5, 8/12, 8/18, 8/31	6	None Reported
	90%	7/28, 8/6, 8/15, 8/31	4	
Lucky Lake 1	85%	8/6, 8/13	2	None Reported
	90%	8/6, 8/15	2	
Lucky Lake 2	85%	7/17, 7/24, 8/1, 8/9, 8/15, 8/25	6	None Reported
	90%	8/6, 8/13, 8/19, 9/11	4	
Lumsden	85%	7/18, 7/25, 8/3, 8/11, 8/17, 8/31	6	None Reported
	90%	8/5, 8/13, 8/23	3	
Nipawin	85%	7/17, 7/25, 8/6, 8/13, 8/20, 9/7	6	None Reported
	90%	8/1, 8/15, 8/31	3	
Outlook (B. King)	85%	7/24, 8/6, 8/14, 8/25	4	8/2
	90%	8/6, 8/13, 9/11	3	
Outlook (H. Taylor)	85%	7/17, 7/24, 8/3, 8/9, 8/15, 8/21, 8/31	7	8/2
	90%	7/31, 8/7, 8/14, 8/21, 9/3	5	
Outlook (W. Redlick)	85%	7/17, 7/25, 8/6, 8/15	4	8/2
	90%	8/6, 8/15	2	
Quill Lake	85%	7/15, 7/20, 7/27, 8/5, 8/11, 8/19, 8/30	7	None Reported
	90%	7/17, 7/25, 8/6, 8/13, 8/31	5	
Saskatoon	85%	7/25, 8/5, 8/13	3	Late August
	90%	8/6, 8/15	2	
*Interpret with caution				
Tisdale	85%	7/14, 7/20, 7/29, 8/6, 8/12, 8/20, 9/7	7	None Reported
	90%	7/17, 7/29, 8/9, 8/21, 9/11	5	
Yorkton	85%	7/18, 8/6, 8/14, 8/20, 8/31, 9/12	6	Mid August
	90%	8/6, 8/14, 8/21, 9/12	4	

NegFry Results

2000

Site	RH Threshold	Spray Dates (Month/Day)	# of Sprays	Late Blight (Month/Day)
Carrot River	85%	7/15, 7/22, 8/3, 8/11, 8/20, 9/3	6	None Reported
	90%	7/24, 8/3, 8/11, 8/20, 9/5	5	
Craven	85%	7/19, 7/25, 8/5, 8/13, 8/22, 9/3	6	None Reported
	90%	7/25, 8/5, 8/15, 9/2	4	
Nipawin	85%	7/13, 7/19, 7/26, 8/3, 8/9, 8/16, 8/24, 9/3	8	8/22
	90%	7/18, 7/24, 8/3, 8/9, 8/16, 8/24, 9/3	7	
Outlook (J. Massey)	85%	7/14, 7/21, 7/29, 8/4, 8/10, 8/17, 8/25, 9/2	8	8/7
	90%	7/20, 7/28, 8/4, 8/10, 8/18, 8/30	6	
Outlook (K. Redlick)	85%	7/16, 7/22, 7/29, 8/5, 8/14, 8/29	6	8/7
	90%	7/26, 8/4, 8/11, 8/30	4	
Quill Lake	85%	7/15, 7/22, 8/1, 8/7, 8/14, 9/2	6	None Reported
	90%	7/24, 8/1, 8/8, 8/16, 9/3	5	
Riverhurst North	85%	7/14, 7/19, 7/25, 7/30, 8/5, 8/11, 8/17, 9/2	8	1st week of September
	90%	7/23, 7/30, 8/5, 8/11, 8/18, 9/3	6	
Riverhurst South	85%	7/14, 7/21, 7/29, 8/5, 8/11, 8/20, 9/4	7	None Reported
	90%	7/21, 7/30, 8/7, 8/14, 9/6	5	
Saskatoon	85%	7/14, 7/21, 7/29, 8/6, 8/14, 9/2	6	8/6
	90%	7/20, 7/28, 8/6, 8/30	4	
*Interpret with caution				
Scott	85%	7/14, 7/21, 7/29, 8/4, 8/10, 9/5	6	None Reported
	90%	7/20, 7/28, 8/4, 8/10, 9/5	5	
*Interpret with caution				
SIDC	85%	7/20, 7/25, 8/1, 8/7, 8/14, 8/24, 9/3	7	8/7
	90%	7/25, 7/31, 8/6, 8/14, 8/29, 9/5	6	
Tisdale	85%	7/18, 8/3, 8/11, 9/2	4	8/15 (Melfort)
	90%	8/3, 8/11, 9/2	3	
*Interpret with caution				
Yorkton	85%	7/15, 7/25, 8/5, 8/13, 9/2	5	7/26
	90%	7/25, 8/8, 8/28, 9/5	4	

NegFry Results

2001

Site	RH Threshold	Spray Dates (Month/Day)	# of Sprays	Late Blight (Month/Day)
Carrot River	85%	7/12, 7/17, 7/25, 8/1, 8/10, 8/30	6	None Reported
	90%	7/14, 7/21, 7/27, 8/14	4	
Craven	85%	7/11, 7/16, 7/25, 8/3, 8/13	5	None Reported
	90%	7/14, 7/20, 7/31, 8/15	4	
Nipawin	85%	7/14, 7/20, 7/26, 8/5, 8/30	5	None Reported
	90%	7/17, 7/23, 7/30, 8/30	4	
Outlook (G. Larsen)	85%	7/14, 7/16, 7/24, 7/28, 8/6, 8/14, 8/22	7	None Reported
	90%	7/22, 7/28, 8/9, 9/7	4	
Outlook (J. Tilk)	85%	7/14, 7/16, 7/23, 7/25, 7/31, 8/5, 8/13, 8/15, 8/16, 9/8	10	None Reported
	90%	7/17, 7/24, 7/26, 8/9, 8/16	5	
Quill Lake	85%	7/15, 7/20, 7/26, 8/4, 8/30	5	None Reported
	90%	7/17, 7/23, 8/2	3	
Riverhurst North	85%	7/13, 7/16, 7/25, 8/5, 8/25	5	None Reported
	90%	7/16, 7/25, 8/12	3	
Riverhurst South	85%	7/14, 7/31	2	None Reported
	90%	None	0	
Saskatoon	85%	7/16, 7/25, 8/9, 9/12	4	None Reported
	90%	7/25, 8/30	2	
SIDC	85%	7/12, 7/15, 7/22, 7/27, 8/3, 8/8, 8/15, 8/26	8	None Reported
	90%	7/17, 7/23, 8/1, 8/10, 8/21	5	
Tisdale	85%	7/16, 7/23, 7/31, 8/15	4	None Reported
	90%	7/17, 7/23, 8/14	3	
Yorkton	85%	7/12, 7/17, 7/25, 8/3, 8/14	5	None Reported
	90%	7/15, 7/25, 8/5	3	